



# DYNAMITE FROM THE SKIES

BY HUDSON MAXIM

**W**HEN we look into the air at Garden City, Long Island, on a pleasant afternoon and see flitting aeroplanes flock the sky, it is hard to realize that the thing is actual, and, awaking from the impress of the marvel of it, we naturally turn to divination as to what uses the future will make of the flying machine.

Taking into consideration the comparatively brief time that has elapsed since the first heavier than air machine flew, and the marvelous strides aviation has made in that brief period, particularly within the last twelve months, we feel sure that whatever obstacles may remain in the way of the reduction of aviation to the safe and practical will soon be overcome, and that aeroplanes will be so perfected that aeroplaning will become as safe as automobiling.

Need after need to secure automatic equilibration and stability of the flying machine in its unstable path is being discovered and met by men of the genius and cool-headed daring of the Wrights, Curtiss, Harmon, Hamilton, Paulhan, Farman, Blériot.

Two things are evident,—that mechanical flight will be made safe and practical, and that the personnel of the sterling qualities necessary for reduction to practical utility is available.

What, then, are the prospective uses of aviation? The paramount immediate use in times of peace is sport; but soon, even in times of peace, commuters will travel back and forth from suburban homes to large centers of population by aeroplane. The time that can be saved, and the sport coupled with business in such travel, will recommend its wide adoption.

Cleared alighting areas or wide cleared avenues will radiate from large cities in all directions, over which aeroplanes may pass back and forth, with always a place for safe landing underneath, should anything go wrong.

Since man first swung a club in combat, warfare has commandeered every invention it could utilize, and often a little lead of one people or tribe over another in some implement of war has meant victory for its possessor. Therefore, we naturally inquire of Mars what uses he holds in prospect for the flying machine.

We have recently had demonstrations of the ability of the aeroplane to drop bombs on warships, coast fortifications, and cities, and we have also had our sham battles. A couple of aeroplanes from each of two French army corps meet and fight a mock duel over Paris.

## Little Danger from Bombs

**H**ARDLY anything in the history of warfare has made a stronger appeal to the imagination than the menace of flying machines carrying high-explosive bombs. The wide popular misunderstanding about the power and effectiveness of high explosives has served vastly to heighten the effect. There is probably no one subject about which the popular mind is more ignorant. We frequently read of the discovery of some new explosive a few pounds of which would be sufficient to destroy several city blocks.

I once read in a popular novel how a Russian Nihilist,

pursued by Cossacks, pulled a vial of nitroglycerin from his pocket and poured it on a bridge over which he was crossing, right in the path of his pursuers, which, being exploded by the hoofbeats of the horses, destroyed the entire troop.

Naturally, then, when it is seen that flying machines are easily capable of dropping bombs on anything and everything underneath, the logical anticipation is wide death and destruction; while, as a matter of fact, the marvel of such bombs is not in the destruction they would be capable of working, but in the small damage they could do against warships, cities, or coast fortifications.

Few people realize how big a thing a battleship is or how little the vital parts of a coast fortification are exposed to attack from any direction, and, above all, how immense is a large city like New York. Almost anyone would feel sure that a foreign fleet, like that which could be sent against us by England or Germany, arriving within gunshot of New York and bombarding the city, would work wide destruction, and that we should be at the mercy of the enemy; while, as a matter of cold fact and figure, the cost of the ammunition and the wear and tear of the guns would be far greater than the damage they could do.

The time has passed when cities may be bombarded with profit or advantage, except for the moral effect, and the moral effect soon disappears; as witness how it was at Vicksburg. For a long time before its surrender, exploding shells became so commonplace that they were little heeded.

When the English reckoned up the cost of their bombardment of Alexandria and compared it with the destruction wrought, they made the important discovery that the game was not worth the candle, that the cost of ammunition and the wear and tear of guns had far exceeded the damage done.

## Action of High Explosives

**N**OW, if the huge projectiles weighing half a ton in metal and carrying large bursting charges of high explosives are so inefficient, what are we to expect from aerial bombs, carrying a high explosive merely in some thin casing?

When a twelve-inch high-explosive projectile lands in the streets of a city or penetrates a building and explodes its casing, it provides half a ton of steel fragments; but an aerial bomb, such as could be dropped from an aeroplane, would be without the massive metal casing necessary to provide destructive fragments, and, as such a bomb would not have the structural rigidity to penetrate buildings to any great extent, the damage the bombs could do would depend upon the chance of their landing down some chimney or down the smoke-stack of a war vessel or other vulnerable point in the structure attacked.

In other words, without penetration, the damage that mere masses of high explosives are capable of working

upon warships, coast fortifications, in the streets of cities, or upon buildings, is comparatively insignificant.

A high explosive requires confinement in order to do much damage,—where it can exert its power in the disruption of its container by the pressure generated. For example, if five hundred pounds of high explosive was to be dropped from a flying machine down the smoke-stack of a battleship, it would prove very destructive; or, if it be made to penetrate to the basement of any of our large skyscrapers, it would do considerable damage, but nothing like so much as if dropped down the smoke-stack of a battleship. Such a bomb, dropped and exploded on top of a city building, or dropped and exploded in a city street, would waste its energy upward into the air.

When a mass of high explosive, such, for example, as a five hundred-pound bomb, is exploded upon the surface of the earth, the body of incandescent gases, formed at the instant of explosion, expanding in all directions against the earth and upward and outward, causes the mass of gases to be thrown upward with much greater violence and velocity than in any other direction. In fact, the gases pressing against the solid earth form a crater of greater or less dimensions, according to the mass of explosive detonated, and the great mass of the gases rebounds upward like an elastic ball, expanding as it goes up; that is to say, it ascends in the form of an inverted cone, and the destructive effect downward is not great, and there is but little effect in a horizontal direction.

It is well known that buildings situated adjacent to an explosion of such character have their windows blown out, not away from an explosion, but toward the explosion, by the rush of air to fill the partial vacuum formed by the uprush of the column of heated gases.

## Exaggerated Perils

**I**T is interesting to forecast about what damage might be expected from high-explosive bombs dropped from flying machines. Let us assume, for example, that the Germans should build a fleet of one hundred aeroplanes, each capable of carrying one bomb containing a hundred pounds of dynamite, and capable of making one trip a day to London, dropping its dynamite, and returning to Berlin for another load. And let us assume that each one of these bombs should be capable of destroying on the average one building apiece, which is much more than it could possibly do. Thus, this fleet would destroy one hundred houses a day, three thousand a month, thirty-six thousand a year.

Now, as there have been six hundred thousand houses built in London during the last ten years, or sixty thousand a year, the German aerial dynamite fleet would succeed in destroying only a little more than half of the number annually created.

## Battles in the Air

**I**T is not the aerial bomb that will give the flying machine a high place in wars of the future; but it will be weapons for destroying other flying machines, for aerial raiders are destined to become a very potential